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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,598	09/28/2004	Erik Petrus Antonius Maria Bakkers	NL02 0286 US	8354

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Intellectual Property & Standards  
Phillips Electronics North America Corporation  
1109 McKay Drive Stop SJ41  
San Jose, CA 95131

EXAMINER

SUCH, MATTHEW W

ART UNIT PAPER NUMBER

2891

DATE MAILED: 11/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/509,598

Applicant(s)

BAKKERS, ERIK PETRUS  
ANTONIUS MARIA

Examiner

Matthew W. Such

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 and 13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 13 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I, drawn to claims 1-8 and 13, in the reply filed on 23 October 2006 is acknowledged.

### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Drawings***

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "fourth region" and "fifth region" of claim 6 must be shown or the feature(s) canceled from the claim(s). The "first and second gate electrode" of claim 8 must be shown or the feature(s) canceled from the claims(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must

Art Unit: 2891

be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

#### *Specification*

4. The disclosure is objected to because of the following informality: the word "catalysists" on Page 7, Line 13 should read "catalysts". Appropriate correction is required.

#### *Claim Objections*

5. Claim 8 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claim 8 has not been further treated on the merits.

#### *Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-4 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohta (477).
8. Regarding claim 1, Ohta et al. teaches carbon nanotube devices with a second region (Fig. 1A, 2, 7) that is less than 100 nanometers in the axial direction, and the diameter of the second region is greater than the first and third regions (Fig. 1A, 2, 7). The first and third regions have quantization effects (Figs. 3 and 4). The reference specifically suggests methods by which the device can be used in functional devices (Abstract).
9. Regarding claim 2, Ohta further teaches that the second region has a length in the axial direction less than 20 nanometers (Figs. 1A, 2, 7).
10. Regarding claim 3, Ohta further teaches that the first and third regions have an average diameter in the radial direction of less than 10 nanometers (Figs. 1A, 2, 7).
11. Regarding claim 4, Ohta further teaches that the second region has a diameter less than 50 nanometers (Figs. 1A, 2, 7).
12. Regarding claim 6, Ohta further teaches that the nanowire can have a fourth and a fifth region with a fourth region enclosed in the axial direction by a third and fifth region (Fig. 1A). The fourth region has a length less than 100 nanometers (Fig. 1A). The fourth region is

Art Unit: 2891

structurally different than the third and fifth regions in that it has a smaller bandgap (Figs. 3A, 3B; Col. 9, Lines 10-43).

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohta ('477) in view of Choi ('133).

Ohta teaches the device of claim 1, wherein the nanowires can be n-type or p-type (Col. 9, Lines 59-60) for functional devices (Abstract). Ohta does not explicitly teach the specific regions of the carbon nanowire being n-type or p-type, nor connecting the nanotube to two electrodes.

Choi teaches a bipolar transistor using a nanowire doped n-type in a first region (Element 101a or 101b; Fig. 3A-3B) and p-type in a second region (Element 102; Fig. 3A-3B; Para. 0031-0032). It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce a nanowire with an n-type first region and a p-type second region connected between two electrodes in order to produce a bipolar transistor (Choi Abstract). Choi teaches that the nanowire based transistors are advantageous for improved integration and operating speed of the device (Abstract; Para. 0033 and 0049).

Art Unit: 2891

15. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohta ('477) in view of Tohji (J. Phys. Chem. B).

Ohta teaches the device of claim 1 without teaching a dispersion in a dispersing agent.

Tohji teaches a dispersion of nanowires in a dispersing agent, such as toluene (see Purification of SWNTs section). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a dispersion of nanowires in a dispersing agent in order to purify the nanowires (Tohji).

### ***Conclusion***

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- i. Crespi ('262) teaches configurations for carbon nanotube nanowires;
- ii. Majumdar ('408) teaches configurations of nanowires with p-n junctions;
- iii. Silverbrook ('810) teaches configurations of carbon nanotube junctions.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew W. Such whose telephone number is 571-272-8895.

The examiner can normally be reached on Monday - Friday 8AM-5PM EST.

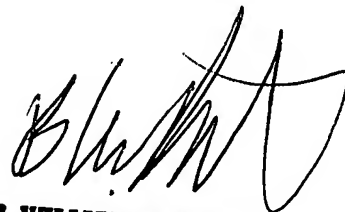
Art Unit: 2891

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bradley W. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew W. Such  
Examiner  
Art Unit 2891

MWS  
11/1/06



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